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How French Sheds New Light on Scalar Particles

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Abstract

This paper examines the behavior of the French scalar focus-sensitive particles *même*, *quand même*, *ne serait-ce que* and *seulement* as compared to English *even* and *only*. I first show that French *même* displays a more restricted distribution than *even*: this behavior and that of its antonym *quand même* argue for the scope theory against the ambiguity theory of *even*. Secondly, I demonstrate that the behavior of *ne serait-ce que* and *seulement* reveal the existence of an intrinsic link between *even*-like particles and *only*-like particles. To capture this observation and more generally the organic relation between scalar particles, I propose a new, parsimonious, theory that builds scalarity, additivity and exclusivity of scalar particles into a conjunctive or disjunctive meaning.

Theories of the distribution and interpretation of scalar particles such as *even* have not reached any consensus yet as all face problems. Specifically, the ambiguity theories of *even* (i.a. Rooth 1985, Rullmann 1997, Herburger 2000, Schwarz 2005, Giannakidou 2007) and *only* (scalar vs. non-scalar) are uneconomical, the scope theories of *even* (i.a. Horn 1971, Karttunen and Peters 1979, Wilkinson 1996, Lahiri 1998, Guerzoni 2003) have to postulate island violating scope mechanisms, and analyses of ‘also only’ particles (i.a. Guerzoni 2003) propose presupposition/assertion swapping under negation.

The goal of this paper is to shed new light on how scalar particles partition their meaning domain based on some novel, detailed empirical observations on French. First, it will be shown how the distribution of *même*, which is more restricted than its supposed English counterpart *even*, and that of its colloquial antonym *quand même*, argue for the scope theory (Section 1). Then, we will examine how *seulement* is conversely less restricted in

its distribution and interpretation than its supposed English counterpart *only*, and how its behavior and that of another particle close to *only*, namely *ne serait-ce que*, demonstrate the existence of an intrinsic link between *only*-like particles and *even*-like particles (Section 2). Based on these novel empirical observations, a new, parsimonious, theory of scalar particles incorporating the scope hypothesis will be proposed, one that derives the *even/only* duality in French, and shows great promise in terms of its crosslinguistic extendability (Section 3).

1 How *même* and *quand même* argue in favor of the scope theory

1.1 Background: the two theories of *even* and their issues

Even is standardly analyzed as a focus sensitive particle that induces ordering of the focus alternatives based on expectedness or likelihood. For instance in (1), *even* implies that the pope was the least likely individual for Julie to invite.

(1) *Julie even invited [the POPE]_F.*

More precisely, *even* takes the whole proposition as argument and associates with the focused constituent *the pope*. As standardly assumed (i.a. Karttunen and Peters 1979), the contribution of *even* is not truth-conditional: it presupposes that the proposition is less likely than its alternatives (scalar presupposition) and some of the alternatives are true (existential presupposition)¹ as formulated in (2) based on Rooth (1985, 1992)'s analysis of focus.

¹ The quantificational strength (universal vs. existential) of both presuppositions has been debated. I will not take a stand on this issue, which is not crucial for the goal of this paper.

(2) (1) = *even* (p), p: Julie invited the pope
 Ordinary meaning of p: $\llbracket p \rrbracket^0 = 1$ iff Julie invited the pope
 Focal meaning of p: $\llbracket p \rrbracket^f = \{\text{Julie invited } x \mid x \text{ is an individual}\}$
 Scalar presupposition: $\forall q ((q \in C \wedge q \neq p) \rightarrow p < q)$ where $<$ means “less likely than” and C is a covert variable denoting the set of contextually given alternative propositions, such that $C \subseteq \llbracket p \rrbracket^f$ and $\llbracket p \rrbracket^0 \in C$
 i.e. the pope is the least likely individual to be invited by Julie
 Additive presupposition: $\exists q (q \in C \wedge q \neq p \wedge q \text{ is true})$
 i.e. Julie invited other people than the pope

The debate about *even* is due to its behavior in negative contexts like (3).

(3) # *Julie did not even invite [the POPE]_F.*

As opposed to (1), (3) implies that the pope was the most likely person for Julie to invite; that’s why (3) is infelicitous in stereotypical contexts where you invite people you are closest to. Moreover, (3) implies that Julie did not invite anybody. In other words, (3) seems to have reverse presuppositions as compared to (1).

Based on this observation, it has been proposed that *even* takes scope over negation, which derives the correct presuppositions as detailed in (4).

(4) (3) = *even* (p’), p’: Julie did not invite the pope
 $\llbracket p' \rrbracket^0 = 1$ iff Julie did not invite the pope
 $\llbracket p' \rrbracket^f = \{\text{Julie did not invite } x \mid x \text{ is an individual}\}$
 Scalar presupposition: $\forall q ((q \in C \wedge q \neq p') \rightarrow p' < q)$
 i.e. the pope is the least likely individual not to be invited by Julie
 Additive presupposition: $\exists q (q \in C \wedge q \neq p' \wedge q \text{ is true})$
 i.e. it is also the case that Julie did not invite other people

Specifically, proponents of the scope theory (i.a. Horn 1971, Karttunen and Peters 1979, Wilkinson 1996, Lahiri 1998, Guerzoni 2003, Nakanishi 2006) assume that *even* - just like a Positive Polarity Item (PPI) - takes wide scope over downward entailing (DE) operators.

This theory however faces some problems. First, Rullmann (1997) claims that other focus

Other orthogonal issues that I will not examine here include whether the scale invoked by *even* should be defined in terms of likelihood, which exact syntactic position *even* occupies and how it relates to the size of the associate focus constituent.

sensitive particles cannot freely scope over negation as exemplified in (5) involving *only*.

(5) *John did not only invite Bill.*

(5) cannot mean that it is only the case that John did not invite Bill: *only* cannot outscope the negation. Furthermore, the proponents of the scope theory have to assume that *even* can violate island constraints to raise over DE operators in cases like (6).

(6) a. *Every student who came to class even once will pass the exam.*

b. *If John arrived late even once, he will be fired.*

In both sentences in (6), the right meaning can be computed only if *even* takes wide scope, thus raising out of the relative clause in (a) and out of the conditional clause in (b), and thereby disobeying island constraints. This is shown in (7).

(7) a. *even (every student who came to class [once]_F will pass the exam)*

Scalar presupposition: ‘every student who came to class once will pass the exam’ is less expected than ‘every student who came to class more than once will pass the exam’.

b. *even (if John arrived late [once]_F, he will be fired)*

Scalar presupposition: ‘if John arrived late once, he will be fired’ is less expected than ‘if John arrived late more than once, he will be fired’.

To avoid these problems raised by the scope theory, the proponents of the ambiguity theory (i.a. Rooth 1985, Rullmann 1997, Herburger 2000, Schwarz 2005, Giannakidou 2007) propose two opposite lexical entries for *even* as represented in (8), based on the observation that many languages have a specific form for NPI *even*.

(8) Ambiguous *even* under the ambiguity theory

a. PPI *even*

Scalar presupposition: $\forall q ((q \in C \wedge q \neq p) \rightarrow p < q)$

Additive presupposition: $\exists q (q \in C \wedge q \neq p \wedge q \text{ is true})$

b. Negative Polarity Item (NPI) *even*

Scalar presupposition: $\forall q ((q \in C \wedge q \neq p) \rightarrow p > q)$

Additive presupposition: $\exists q (q \in C \wedge q \neq p \wedge q \text{ is false})$

Thus (3) is not derived by scoping *even* over negation as in the scope theory: on the contrary, *even* is in that case a NPI that needs to be outscoped by negation, and it

presupposes that the alternatives are less expected and that some of them are false, i.e. it was less likely for Julie to invite other people than the pope and there are some other people that Julie did not invite. This correctly predicts that (3) is infelicitous in stereotypical contexts.

But the ambiguity theory also faces problems. First, it is conceptually problematic to suppose that *even* is ambiguous between two opposite meanings depending on the negativity of the context. Secondly, this theory does not capture the fact that the felicity of *even* in the scope of a universal quantifier depends on the content external to the minimal clause in which *even* is base-generated as illustrated in (9).

- (9) a. *Every student [who read **even** one paper] will pass the exam.*
b. *#Every student [who read **even** one paper] will fail the exam.*

For instance, the ambiguity theory would make the same predictions for (9)a and (9)b (i.e. *even* presupposes that it is more likely for a student to read one paper rather than more than one) disregarding the difference of matrix verbs (*pass* vs. *fail*) contrary to facts: in stereotypical contexts, only (9)a is felicitous. The scope theory however correctly captures the difference since it predicts *even* to scope over the whole sentence.

Furthermore, both theories face the same issue in non-DE environments that give rise to the same reading as negative contexts. This reading, which corresponds to the meaning of NPI *even* under the ambiguity theory, will henceforth be called the most-likely reading of *even*, while the reading corresponding to the meaning of PPI *even* under the ambiguity theory will be called the least-likely reading of *even*. The problem arises in modal environments like (10), which are standardly assumed to be upward monotone, and with non-monotone quantifiers as in (11).

- (10) a. *Show me even one party that cares for the people.*
 b. *To pass, John needed to prove he attended the lectures even once.*
 c. *The band hopes to someday make even one video of that quality.*
 d. *John is glad that Mary arrived on time even once.* (from Crnić 2011)

- (11) *Exactly four people in the whole world will open this dissertation even once.*
 (from Crnić 2011)

Under the scope theory, there is no DE operator over which *even* can take scope; under the ambiguity theory, there is no licenser for NPI *even*, so that both theories incorrectly predict *even* to have the least-likely reading in these cases. In fact, all the propositions in (10) and (11) are presupposed to be more likely than their alternatives: for instance, (10)a presupposes that it is more expected to show one party that cares for the people than more than one such party. Furthermore, there does not seem to be any additive presupposition in those cases: for example, the imperative in (10)a imposes no additional requirement on the addressee other than to show the speaker one political party that cares for the people.

In sum, both the scope theory and the ambiguity theory of *even* are challenged by several problems, some of which are common to both theories. The meaning of *even* according to its distribution is summarized in Table 1: the columns correspond to different contexts of occurrences of *even*, i.e. positive, anti-additive,² other DE, and modal/non monotone environments, while the two lines indicate the two readings of *even* – most-likely and least-likely - according to the position of the focus associate on the likelihood scale. While the scope theory captures the most-likely readings of *even* by scoping it over DE operators, thereby violating island constraints in some cases, the ambiguity theory

² Zwarts (1998) characterizes anti-additive operators (such as the sentence negation or the quantifier *no*) as a subset of DE operators that licence strong NPIs. Anti-additive functions satisfy the following definition: *f* is anti-additive iff $f(A \vee B) \leftrightarrow f(A) \wedge f(B)$.

postulates two opposite meanings of *even*; moreover, both theories fail in predicting the reading in the shaded cell.

Position on scale of focus associate\ Context of occurrence	Positive	Anti-additive	Other DE	Modal, non monotone
Top e.g. ‘invite the pope’	least-likely <i>even</i>		least-likely <i>even</i>	least-likely <i>even</i>
Bottom e.g. ‘invite one’s best friend’		most-likely <i>even</i>	most-likely <i>even</i>	most-likely <i>even</i>

Table 1. Distribution and interpretation of *even*.

1.2 French *même*

Même is usually assumed to behave like *even* (i.a. Gast and Auwera 2011, Crnič 2011). But in fact, *même* differs from *even* in crucial ways: in particular, it does not raise the problems that *even* raises under the scope theory, which argues for the scope theory against the ambiguity theory.

First, *même* is not acceptable under the most-likely reading in the environments that are problematic for both theories of *even*, namely in modal and non-monotone contexts. The French equivalents of (10)-(11) are indeed not felicitous in stereotypical contexts as shown in (12)-(13), because they only give rise to the least-likely reading of *même*.³

(12) a. ?? *Montre-moi même un parti qui se soucie du peuple.*

show to-me *même* one party that REFL cares of-the people

‘Show me even one party that cares for the people.’

b. ?? *Pour passer, Jean devait prouver qu’ il avait assisté aux cours*

for pass John had-to prove that he has attended at-the course

même une fois.

même one time

‘To pass, John needed to prove he attended the lectures even once.’

c. ?? *Le groupe espère un jour faire même une vidéo de cette qualité.*

the band hopes a day make *même* one video of this quality

³ Least-likely readings of *même* are acceptable in these environments as exemplified below.

(i) *Invite même le maire !*

invite *même* the mayor

‘Invite even the mayor!’

As opposed to sentence (12), sentence (i) involving an imperative is felicitous, e.g. in a situation where the addressee wants to invite a lot of people to celebrate the opening of his/her new company.

- ‘The band hopes to someday make even one video of that quality.’
 d. ?? *Jean est content que Marie arrive à l’ heure même une fois.*
 John is happy that Mary arrives at the time même one time
 ‘John is glad that Mary arrived on time even once.’

(13) ?? *Exactement quatre personnes dans le monde entier vont ouvrir cette*
 exactly four people in the world whole will open this
thèse même une fois.
 dissertation même a time
 ‘Exactly four people in the whole world will open this dissertation even once.’

Furthermore, French *même* is not acceptable under the most-likely reading in the counterparts of (6), namely in (14), i.e. in environments that lead to island violation under the scope theory and are predicted to be suitable environments for NPI *even* under the ambiguity theory.

- (14) a. ?? *Tout étudiant qui est venu en cours même une fois réussira l’ examen.*
 all student who is come in course même one time will-pass the exam
 ‘Every student who came to class even once will pass the exam.’
 b. ?? *Si Jean arrive en retard même une fois, il sera viré.*
 if John arrives in late même one time he will-be fired
 ‘If John arrived late even once, he will be fired.’

In sum, *même* exhibits most-likely readings only in anti-additive contexts as shown in (15): the anti-additive operators *ne pas* ‘not’ and *sans* ‘without’ license the most-likely reading of *même* as opposed to the non anti-additive operator *peu* ‘few’.

- (15) a. *Paul n’ a même pas invité son meilleur ami.*⁴
 Paul NEG has même not invited his best friend
 ‘Paul didn’t even invite his best friend.’
 b. *Paul est parti sans même dire au revoir.*
 Paul is left without même say goodbye
 ‘Paul left without even saying goodbye.’
 c. ?? *Peu d’ étudiants sont même venus en cours.*
 few of students are même come in course
 ‘Few students even came to class.’

⁴ The relative surface order of *même* and the negation can be reversed for some French speakers as in (ii):

(ii) % *Paul n’ a pas même invité son meilleur ami.*
 Paul NEG has not même invited his best friend
 ‘Paul didn’t even invite his best friend.’

The meaning of *même* depending on the contexts of occurrence is summarized in Table 2.

Position on scale of focus associate\ Context of occurrence	Positive	Anti-additive	Other DE	Modal, non monotone
Top e.g. ‘invite the pope’	<i>même</i>		<i>même</i>	<i>même</i>
Bottom e.g. ‘invite one’s best friend’		<i>même</i>		

Table 2. Distribution and interpretation of *même*.

Therefore, *même* is well-behaved under the scope theory: no island-violating mechanism needs to be postulated since *même* only takes scope over negation in cases like (15)a-b as represented in (16).

- (16) a. *même* (Paul **n’** a **pas** invité son meilleur ami)
même Paul NEG has not invited his best friend.
b. *même* (Paul est parti **sans** dire au revoir)
même Paul is left without say goodbye.

Thus, no homonymy has to be assumed for *même* as in the ambiguity theory of *even*: *même* simply corresponds to PPI *even*, and the most-likely reading obtains by scoping *même* over negation.

- (17) Contribution of *même* (first version)
Scalar presupposition: $\forall q ((q \in C \wedge q \neq p) \rightarrow p < q)$
Additive presupposition: $\exists q (q \in C \wedge q \neq p \wedge q \text{ is true})$

1.3 French quand même

French colloquial *quand même*⁵ further argues for the scope theory against the ambiguity theory, which would require more homonymy and synonymy to capture its behavior.

⁵ French *quand même* also has a concessive use as illustrated in (iii).

(iii) *Caroline est malade, mais elle est quand même venue.*
Caroline is sick but she is *quand même* come
‘Caroline is sick, but nonetheless she came.’

The meaning of *quand même* in (18)-(21) may be historically derived from its concessive meaning: for instance, (20b) could be understood as ‘Paul didn’t invite the others, but he nevertheless invited his best friend’.

Indeed, *quand même* displays the opposite behavior of *même*: it exhibits a most-likely reading in positive contexts and a least-likely reading in negative contexts.

(18) # *Paul a quand même invité le pape.*
Paul has *quand même* invited the pope
'≈At least, Paul invited the pope.'

(19) *Paul n' a quand même pas invité le pape.*
Paul NEG has *quand même* not invited the pope
'≈At least, Paul did not invite the pope.'

(20) *Paul a quand même invité son meilleur ami.*
Paul has *quand même* invited his best friend
'≈At least, Paul invited his best friend.'

(21) # *Paul n' a quand même pas invité son meilleur ami.*
Paul NEG has *quand même* not invited his best friend
'≈At least, Paul did not invite his best friend.'

In positive contexts like (18) and (20), *quand même* implies that the alternatives are less likely; that's why it can felicitously associate with *son meilleur ami* 'his best friend', but not with *le pape* 'the pope', in stereotypical contexts. By contrast, *quand même* implies that the alternatives are more likely in negative contexts like (19) and (21); that's why conversely, it can felicitously associate with *le pape* 'the pope', but not with *son meilleur ami* 'his best friend'. In other words, *quand même* exhibits the exact opposite behavior of *même* with respect to its presuppositions.

This means that under the ambiguity theory, we would have to postulate the existence of another pair of opposite lexical entries, namely PPI *quand même* and NPI *quand même*, which would be synonymous with NPI *even* and PPI *even* respectively. This clearly goes against parsimony. On the other hand, the scope theory directly captures the facts: we simply need to assume that *quand même* is the antonym of *même* as formulated in (22), and is a PPI scoping over DE operators, just like *même*.

(22) Contribution of *quand même* (first version)

Scalar presupposition: $\forall q ((q \in C \wedge q \neq p) \rightarrow p > q)$

Additive presupposition: $\exists q (q \in C \wedge q \neq p \wedge q \text{ is false})$

This correctly predicts the distribution of *quand même* summarized in Table 3, given that *quand même* only exhibits a most-likely reading in DE contexts other than anti-additive contexts as in (23) and in modal and non-monotone environments as in (24).

(23) *Tout étudiant qui est venu en cours quand même une fois réussira l' examen.*

all student who is come in course *quand même* one time will-pass the exam

‘≈Every student who at least came to class once will pass the exam.’

(24) *Jean est content que Marie arrive à l' heure quand même une fois.*

John is happy that Mary arrives at the time *quand même* one time

‘≈John is glad that Mary at least arrived on time once.’

Position on scale of focus associate\ Context of occurrence	Positive	Anti-additive	Other DE	Modal, non monotone
Top e.g. ‘invite the pope’		<i>quand même</i>		
Bottom e.g. ‘invite one’s best friend’	<i>quand même</i>		<i>quand même</i>	<i>quand même</i>

Table 3. Distribution and interpretation of *quand même*.

To wrap up this section, the behaviors of French *même* and *quand même* argue for the scope theory against the ambiguity theory as they do not raise the problems posed by *even* under the scope theory (no island violating scope mechanism has to be postulated) and they make the problems of the ambiguity theory worse (more homonymy and synonymy have to be postulated).

2 How French scalar particles reveal an intrinsic link between *even* and *only*

French presents at least two other scalar particles, namely *ne serait-ce que* and *seulement*.

They shed further light on scalar particles in revealing an intrinsic link between *even*-like

particles and *only*-like particles. These additional new empirical observations will lead us to the building of a new theory of scalar particles in section 3.

2.1 Ne serait-ce que

*Ne serait-ce que*⁶ (literally ‘were it only’) occurs in contexts where *even* exhibits most-likely readings; in particular, it complements *même* in displaying the most-likely reading where *même* only exhibits the least-likely reading as shown in Table 4.

Position on scale of focus associate\ Context of occurrence	Positive	Anti-additive	Other DE	Modal, non monotone
Top e.g. ‘invite the pope’	least-likely <i>even</i> <i>même</i>		least-likely <i>even</i> <i>même</i>	least-likely <i>even</i> <i>même</i>
Bottom e.g. ‘invite one’s best friend’		most-likely <i>even</i> <i>même</i> <i>ne serait-ce que</i>	most-likely <i>even</i> <i>ne serait-ce que</i>	most-likely <i>even</i> <i>ne serait-ce que</i>

Table 4. distribution and interpretation of *ne serait-ce que* as compared to *even* and *même*

This is first the case in modal and non-monotone environments. We observed in (12)-(13) that the French equivalents of (10)-(11) with *même* are not felicitous because they only give rise to a least-likely reading. But they become as felicitous as (10)-(11) if we replace *même* with *ne serait-ce que* as exemplified in (25) and (26).

- (25) *Montre-moi ne serait-ce qu’ un parti qui se soucie du peuple.*
show to-me *ne serait-ce que* one party who REFL cares of-the people
‘Show me even one party that cares for the people.’

- (26) *Exactement quatre personnes dans le monde entier vont ouvrir cette*
exactly four people in the world whole will open this
thèse ne serait-ce qu’ une fois.
dissertation *ne serait-ce que* one time
‘Exactly four people in the whole world will open this dissertation even once.’

Moreover, *ne serait-ce que* is the counterpart of *even* in DE contexts that trigger island

⁶ It is mentioned as *ne fût-ce que* in Gast and Auwera (2011) and Crnić (2011). *Ne fût-ce que* (including the imperfect subjunctive *fût* of *être* ‘be’ instead of the conditional *serait*) is even more formal than *ne serait-ce que* and is very rarely used.

violation under the scope theory and do not license *même*, e.g. in conditional clauses as exemplified in (27), which is the counterpart of (6)b.

- (27) *Si Jean arrive en retard ne serait-ce qu' une fois, il sera viré.*
 if John arrives in late *ne serait-ce que* one time he will-be fired
 'If John arrived late even once, he will be fired.'

Ne serait-ce que can also be used in anti-additive contexts as in (28) involving *jamais* 'never'.

- (28) *Paul n' a jamais eu ne serait-ce qu' un ami.*
 Paul NEG has never had *ne serait-ce que* one friend
 'Paul has never had even one friend.'

In sum, *ne serait-ce que* seems to behave like a NPI inducing the same scalarity presupposition as *quand même*. Moreover, it occurs in contexts that do not trigger any additive presupposition (cf. 'at least') as we discussed in the case of (10)a.⁷

- (29) *Ne serait-ce que* (first version)
 Scalar presupposition: $\forall q ((q \in C \wedge q \neq p) \rightarrow p > q)$

Ne serait-ce que is thus the reverse of *même* in many respects: it implies opposite scalarity effects and scopes under negation. That's why *ne serait-ce que* turns out to give rise to the same readings as *même* in anti-additive contexts like (28), where *ne serait-ce que* and *même* have both opposite scalarity presuppositions and opposite scopes as represented in (30).

⁷ The absence of additive inference in the case of *ne serait-ce que* clearly appears in positive modal contexts such as the following.

- (iv) *Paul voudrait inviter ne serait-ce que Virginia.*
 Paul would-like invite *ne serait-ce que* Virginia
 'Paul would like to invite at least Virginia.'

(iv) does not necessarily imply that Paul wants to invite other people than Virginia. Note that if (28) implies that Paul didn't invite anybody, it is because the alternatives ('Paul has never had more than one friend') are logically implied by the proposition ('Paul has never had one friend'). This is true in the absence of *ne serait-ce que*.

- (30) *Paul n'a jamais eu ne serait-ce que/même un ami.*
 a. **même** (Paul has **never** had one friend)⁸
 b. **never** (***ne serait-ce que*** (Paul has had one friend))

But *ne serait-ce que* and *même* exhibit opposite meanings in other DE contexts such as (31): *même* cannot scope over the DE operator in this case because of island constraints, so that *même* and *ne serait-ce que* have the same scope and thus opposite scalarity effects due to their meanings. That's why (31)b is felicitous as opposed to (31)a.

- (31) a. cf. (14) #***Si Jean arrive en retard même une fois, il sera viré.***
 if (même (Jean came late once))
 b. cf.(27) ***Si Jean arrive en retard ne serait-ce qu'une fois, il sera viré.***
 if (ne serait-ce que (Jean came late once))

This link between *ne serait-ce que* and *même* interestingly reveals an intrinsic relation between *only*-like particles and *even*-like particles. *Ne serait-ce que* indeed includes the exclusive particle *ne ... que* close in meaning to 'only'. The behavior of French *seulement*, also close to 'only', makes that link even more striking.

2.2 Seulement

French *seulement*⁹ is standardly assumed to behave like *only* as suggested by (32).

- (32) *Paul a seulement invité un ami.*
 Paul has *seulement* invited one friend
 'Paul only invited one friend.'

But the following corpus examples reveal an interesting new fact about *seulement*: *seulement* can induce the most-likely reading of *even* in negative contexts. In fact,

⁸ For the reasons stated in footnote 4, more speakers accept this sentence with *même* if *même* surfaces before the negation, i.e. before *jamais* 'never' (*Paul n'a même jamais eu d'ami*).

⁹ The adjectival counterpart of *seulement*, namely *seul*, behaves similarly:

- (v) *Paul a invité un seul ami.*
 Paul has invited one *seul* friend
 'Paul only invited one friend/Paul invited a single friend.'

Other French expressions corresponding to English *only* include *ne...que*, *rien ...que* and *juste*, which are mainly used in colloquial French. They cannot be treated here for space reasons given that their behavior is not identical to that of *seulement/seul*.

seulement could be replaced with *même* in anti-additive environments like (33)-(34) and with *ne serait-ce que* in other DE environments like (35) without any perceptible change in meaning.

- (33) *Un peu plus, tu allais être venu à Paris sans **seulement** avoir vu notre petit!*
 a few more you went be come to Paris without *seulement* have seen our child
 ‘You almost came to Paris without even seeing our child!’
 (Martin du Gard, *les Thibault*; 1940, 793)

- (34) *Je crois bien que je ne te donnerai plus rien. Pas **seulement** ça!*
 I believe well that I NEG to-you will-give anymore nothing not *seulement* that
 ‘I think I will not give you anything any more. Not even that!’
 (Balzac, *Eugénie Grandet*; 1834, 196)

- (35) *La vie est trop courte pour qu’on puisse s’embêter pendant **seulement** une heure.*
 the life is too short for that one can REFL bother during *seulement* a hour
 ‘Life is too short to get bored even for one hour.’
 (Georges Courteline)

Thus, *seulement* seems to exhibit two readings: one similar to *only* in all contexts, and one similar to *even* (under the most-likely reading) in DE environments.¹⁰ This is illustrated in (36)-(37) and represented in Table 5.

- (36) *Luc n’ est pas seulement venu une fois.*
 Luke NEG is not *seulement* come a time
Only-Meaning: Luke didn’t only come once.
Even-Meaning: Luke didn’t even come once.
- (37) *Est-ce que Luc est seulement venu une fois?*
 Q Luke is *seulement* come a time
Only-Meaning: Did Luke only come once?
Even-Meaning: Did Luke even come once? (with negative bias)

¹⁰ This reading sounds formal to most native speakers of French. This is not the case when the adjectival counterpart *seul* is used instead of *seulement*: in (vi), the *even*-meaning is not restricted to high register French.

(vi) a. (cf. 36) *Luc n’ est pas venu une seule fois.*
 Luke NEG is not come a *seul* time
 b. (cf. 37) *Est-ce que Luc est venu une seule fois?*
 Q Luke is come a *seul* time

Position on scale of focus associate\ Context of occurrence	Positive	Anti-additive	Other DE	Modal, non monotone
Top e.g. ‘invite the pope’	least-likely <i>even</i> <i>même</i>		least-likely <i>even</i> <i>même</i>	least-likely <i>even</i> <i>même</i>
Bottom e.g. ‘invite one’s best friend’	<i>seulement-only</i>	most-likely <i>even</i> <i>même</i> <i>ne serait-ce que</i> <i>seulement-only</i> <i>seulement-even</i>	most-likely <i>even</i> <i>ne serait-ce que</i> <i>seulement-only</i> <i>seulement-even</i>	most-likely <i>even</i> <i>ne serait-ce que</i> <i>seulement-only</i>

Table 5. Distribution and interpretation of *seulement* as compared to *even*, *même* and *ne serait-ce que*

2.3 Crosslinguistic link between *even* and *only*

The link between *only*-like and *even*-like particles that is revealed by these new empirical observations on French is observed crosslinguistically: in several languages, the particle used to express most-likely readings of *even* in DE contexts contains an *only*-like particle. This is the case of Italian *anche sole/solanto*, German *auch nur*, Slovak *i len*, Czech *i jen* and Dutch *ook maar*, which literally mean ‘also only’; Japanese *dake-demo* and Dutch *zelfs maar*, which literally mean ‘even only’; and Spanish *tan solo/solamente* and Catalan *tan sols*, which literally mean ‘so only’ (i.a. Hoeksema and Rullmann 2001, Guerzoni 2003, Schwarz 2005, Nakanishi 2006, Gast and Auwera 2011, Crnič 2011). Also, the Straits Salish particle *?al* has been reported to behave like *only* in positive contexts and like *even* in negative contexts (see Shank 2002, Guerzoni 2003).

To account for the association of an *only*-like particle with an *also*-like particle in negative contexts to induce the most-likely reading of *even*, Guerzoni (2003) assumes that *only*-like particles are scalar and in certain conditions, presupposition and assertion can be swapped.

The scalar reading of *only* can be observed in examples such as (38), as has been argued by i.a. Lerner and Zimmerman (1981), König (1991), Klinedinst (2004), Beaver and Clark (2008).

(38) *Bill only has a BA.*

(38) implies that having a BA is lower than the alternatives (e.g. having a MA or a PhD) on a significance scale. Such data motivated the hypothesis of a specific lexical entry for scalar *only* as formulated in (39) based on Guerzoni (2003, 173). Note that whether the scalar presupposition is always part of the meaning of *only* is a matter of controversy (see discussion in e.g. König 1991).

(39) Scalar *only* defined for *only* (p) such that p is a proposition

- a. Factivity Presupposition: $p(w)=1$
- b. Scalarity Presupposition: $\forall q \in C [q \neq p \rightarrow q <_{\text{likely/insignificant}} p]$
i.e. all focus alternatives to p are more significant
- c. Exclusivity Assertion: $\forall q \in C [q \neq p \rightarrow q(w) = 0]$
i.e. the focus alternatives to p are false

Based on this lexical entry, Guerzoni (2003) analyzes the meaning of *also.only*-particles (e.g. German *auch nur*) as the combination of the meaning of *also* and the meaning of *only*. This compositional analysis explains why *also only* is unacceptable in affirmative contexts: the exclusivity conveyed by *only* and the additivity presupposed by *also* (see (40)) are incompatible.

(40) *Also* (p)

Additivity Presupposition: $\exists q [q \in C \wedge q \neq p]$

In negative contexts, the clash can be resolved under the following additional assumptions: *also* in *also only*, but not *only*, can outscope the DE expression, and the

factivity presupposition and exclusivity assertion of *only* are swapped; *only*¹¹ is thus unspecified between the lexical entry in (39) and that in (41).

(41) *Only*₂ (p)

- a. Exclusivity Presupposition: $\forall q \in C [q \neq p \rightarrow q(w) = 0]$
- b. Scalarity Presupposition: $\forall q \in C [q \neq p \rightarrow q <_{\text{likely/insignificant}} p]$
- c. Factivity Assertion: $p(w)=1$

This solution is illustrated with German *auch nur* in (42) (see Guerzoni 2003 for the details of the computation).

(42) *Niemand hat auch nur die Marie getroffen.*

nobody has also only the Marie met

‘Nobody even met Mary.’

Scope: *auch* (*niemand auch nur* hat die Maria getroffen)

In sum, under this view we need to postulate an ambiguity for *only* (between (39) and (41), and potentially also between non-scalar *only* and scalar *only*) to account for the *even*-meaning of *only*-like particles in negative contexts.

Besides issues of parsimony, this account does not naturally extend to French *seulement*, which does not combine with an additive particle in negative contexts to give rise to a most-likely reading. More problematically, French *seulement* exhibits two readings under negation as was shown in (36)-(37), which is not predicted by this analysis. For these reasons, while adopting the scalar analysis of *only*, I propose a different analysis for *seulement* and scalar particles in general, which I lay out in the next section.

¹¹ *Only* is here meant as a generic *only*-particle. Guerzoni (2003) does not apply this analysis to English *only*, but to German *nur* and Italian *solo*. She suggests that English *just* may be unspecified just like *nur* or *solo*.

3 A new theory of scalar particles

3.1 French *seulement*

To account for the distribution of readings shown by *seulement* (two in negative contexts, one in positive contexts), I propose to analyze this particle as a conjunction and derive the double reading under negation from the interaction between conjunction and negation. Specifically, I first assume that *seulement* is always scalar (cf. Klinedinst 2004) in implying that the alternatives are less likely. The apparent difference between standard *seulement* and scalar *seulement* comes from the nature of the scale: *seulement* seems to exclude either lower alternatives on an expectedness scale (and thus higher on a significant scale) or higher alternatives on a numerical scale. But this is logically equivalent as higher alternatives on a numerical scale are less likely than lower alternatives (since the former logically imply the latter). This is illustrated in (43).¹²

- (43) a. *Paul a seulement une licence.*
Paul has *seulement* a license
'Paul only has a BA.'
b. *Paul a seulement un diplôme universitaire.*
Paul has *seulement* one diploma academic
'Paul only has one degree.'

(43)a conveys the idea that having a BA is more likely, and thus less significant, than having a higher diploma; similarly, (43)b implies that having one academic degree is more likely, and thus less significant, than having more than one. Furthermore, these less

¹² This means that a sentence like (vii) has two readings: if the relevant scale is the numerical one, *only* conveys the meaning that John did not see other people than Mary; if the relevant scale is that of significance/expectedness, (vii) implies that Mary was the most insignificant/likely person for John to see.

(vii) *John only saw Mary.*

Note that the assumption of a unified *only* is not crucial to the proposal though, which is compatible with the hypothesis of an ambiguity between scalar *only* and non-scalar *only*.

likely alternatives are excluded in both cases. In short, *seulement* consists of the following meaning components.

(44) *Seulement* (p) (first version)

Exclusivity: $\forall q \in C [q \neq p \rightarrow q(w) = 0]$

Scalarity: $\forall q \in C [q \neq p \rightarrow p >_{\text{likely/insignificant}} q]$

Factivity: $p(w)=1$

This is basically Guerzoni's (2003) lexical entry of *only*, except that I didn't specify whether these meaning components are presuppositional or assertive. Instead of doing so, I propose to conjoin these meaning ingredients as in (45).

(45) *Seulement* (p) (final version)

$\forall q \in C / q \neq p, \textit{seulement} (p) = p \wedge \neg q / p > q$

In words, *seulement* has a conjunctive meaning: it asserts that the proposition it takes as argument is true and that the alternatives lower on a likelihood scale are false. For instance, (46) means that Luke came once and he didn't come more than once.

(46) *Luc est seulement venu une fois.*

Luke is *seulement* come one time

'Luke only came once.'

Crucially, the hypothesis of a conjunctive meaning correctly predicts a disjunctive meaning in negative contexts - assuming that *seulement* scopes under negation - because of De Morgan's law as explained in (47) and illustrated in (36) repeated in (48).

(47) a. De Morgan's law: $\neg (p \wedge q) \leftrightarrow \neg p \vee \neg q$

b. not (*seulement* (p)) = $\neg (p \wedge \neg q)$

= $\neg p \vee q$

(48) *Luc n' est pas seulement venu une fois.*

Luke NEG is not *seulement* come one time

Only-Meaning: Luke didn't only come once.

Even-Meaning: Luke didn't even come once.

Based on (47)b, (48) means that Luke did not come once or he came more than once. The members of the disjunction precisely correspond to the *even*-like and the *only*-like

meanings respectively.

3.2 French *même*, *quand même*, *ne serait-ce que*

The meaning of the other French scalar particles mentioned in the previous sections can be analyzed using the same parameters:

- a. conjunction/disjunction of alternatives
- b. true/false alternatives
- c. more/less likely alternatives
- d. scope under/over negation

Thus, *même*, just like *seulement*, expresses a conjunction, but it differs from it with respect to the three other factors as shown in (49). That's why *même* can induce the same reading as *seulement* in negative contexts, despite different readings in positive environments.

$$(49) \text{ même } (p) \text{ (final version)} \\ \forall q \in C/q \neq p, \text{ même } (p) = p \wedge q / p < q$$

Quand même only differs from *seulement* with respect to its scope with the negation. That's why they display different readings only in anti-additive contexts. The meaning in (50) also captures the antonymy with *même*: *quand même* and *même* both have a conjunctive meaning and scope over negation, but they differ with respect to the two parameters concerning the alternatives.

$$(50) \text{ quand même } (p) \text{ (final version)} \\ \forall q \in C/q \neq p, \text{ quand même } (p) = p \wedge \neg q / p > q$$

As for *ne serait-ce que*, which we saw is close in meaning to 'at least', I propose to analyze it as a disjunction: it conveys the meaning that the proposition it takes as argument or less likely alternatives are true.

(51) *ne serait-ce que* (p) (final version)
 $\forall q \in C/q \neq p, ne\ serait\text{-}ce\ que\ (p) = p \vee q / p > q$

This correctly predicts the equivalence in meaning between *même* and *ne serait-ce que* in negative contexts, given that *ne serait-ce que* scopes under negation, as opposed to *même*. This is shown in (52) and (53).

(52) a. De Morgan's law: $\neg (p \vee q) \Leftrightarrow \neg p \wedge \neg q$
 b. $\neg (ne\ serait\text{-}ce\ que\ (p)) = \neg (p \vee q)$
 $= \neg p \wedge \neg q$

(53) *Luc n' est (même) pas venu (ne serait-ce qu') une fois.*
 Luke NEG is *même* not come *ne serait-ce que* a time
not (*ne serait-ce que* (Luke came once))
même (Luke did **not** come once)
 = Luke did not come once and he did not come more than once

Table 6 summarizes the analysis of the French scalar particles examined in this paper. This correctly predicts their distribution according to their meaning as represented in Table 7.

	Meaning	Position on the likelihood scale	Scope with negation
<i>seulement</i>	$p \wedge \neg q$	$q < p$	NEG > <i>seulement</i>
<i>ne serait-ce que</i>	$p \vee q$	$q < p$	NEG > <i>ne serait-ce que</i>
<i>quand même</i>	$p \wedge \neg q$	$q < p$	<i>quand même</i> > NEG
<i>même</i>	$p \wedge q$	$q > p$	<i>même</i> > NEG

Table 6. Analysis of French scalar particles.

Position on scale of focus associate\ Context of occurrence	Positive	Anti-additive	Other DE	Modal, non monotone
Top e.g. 'invite the pope'	<i>même</i>	<i>quand même</i>	<i>même</i>	<i>même</i>
Bottom e.g. 'invite one's best friend'	<i>seulement-only</i> <i>quand même</i>	<i>même</i> <i>ne serait-ce que</i> <i>seulement-only</i> <i>seulement-even</i>	<i>ne serait-ce que</i> <i>seulement-only</i> <i>seulement-even</i> <i>quand même</i>	<i>ne serait-ce que</i> <i>seulement-only</i> <i>quand même</i>

Table 7. Distribution and interpretation of French scalar particles.

In sum, building the additivity, exclusivity and scalarity of scalar particles into a conjunctive or disjunctive meaning and determining their scope with respect to the

negation allow us to parsimoniously derive the different meanings and distributions of French scalar particles.

3.3 Crosslinguistic consequences

This theory predicts the existence of various scalar particles depending on the parameters (a)-(d) mentioned above. For instance, the particle defined in (54), which only differs from *seulement* with respect to the scalarity component, is expected to exist.

$$(54) \forall q \in C/q \neq p, \text{particle}(p) = p \wedge \neg q / p < q$$

Based on Tomaszewicz's (2012) study, this prediction appears to be borne out: slavic *aż/čak* can be defined as in (54), as illustrated in (55) for Polish.

- (55) *Maria jest aż menedżerem.*
 Maria is *aż* manager
 'Maria got as far as being the manager.'

It would be worth testing more of these predictions based on crosslinguistic work.

What about English? Table 8 summarizes the distribution of (scalar) *only* and *even* depending on their meaning.

Position on scale of focus associate\ Context of occurrence	Positive	Anti-additive	Other DE	Modal, non monotone
Top e.g. 'invite the pope'	least-likely <i>even</i>		least-likely <i>even</i>	least-likely <i>even</i>
Bottom e.g. 'invite one's best friend'	<i>only</i>	most-likely <i>even</i> <i>only</i>	most-likely <i>even</i> <i>only</i>	most-likely <i>even</i> <i>only</i>

Table 8. Distribution and interpretation of English *only* and *even*.

Thus, English *even* seems to correspond to both French *même* ($p \wedge q$) and *ne serait-ce que* ($p \vee q$). Tentatively, I hypothesize that *even* is underspecified between these two meanings and the stronger meaning obtains in the context, namely, $p \wedge q$ in positive environments and $p \vee q$ in negative environments.

Conversely, English *only* is more restricted than French *seulement*: it only exhibits one reading under negation. One possibility is thus to assume that similarly, *only* is underspecified between $p \wedge \neg q$ and $p \vee \neg q$. This should be examined in future work.

4 Conclusion

In this paper, I have provided new empirical observations about French scalar particles, which behave differently from English scalar particles despite what is usually assumed. In particular, French *même* presents a more restricted distribution than English *even* and is complemented by *ne serait-ce que*, which provides further arguments for the scope theory against the ambiguity theory of *even*-like particles. Conversely, the distribution of French *seulement* is less restricted than that of English *only*, which reveals the existence of an intrinsic link between *even*-like particles and *only*-like particles. To capture these new facts and more generally derive the organic relations between scalar particles, I have built a new theory of scalar particles, the behavior of which is claimed to depend on the following parameters: conjunctive/disjunctive meaning; true/false alternatives; more/less likely alternatives; scope under/over negation. Thereby, we do not face the problems of previous accounts, which have to assume island violation or non-economical mechanisms such as multiple ambiguity or assertion/presupposition swapping. This theory makes many crosslinguistic predictions that should be tested in the future.

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